



From the desk of...

Our quality journey

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Quality is a journey, not a destination. We never reach our final objectives, as they keep changing. In a changing business environment, you, our customers, are raising your expectations. While Bently Nevada's emphasis on quality has not changed, our approach to quality has dramatically changed. The following story demonstrates how far-reaching the changes are.

Quality must be designed in

In the early 1980s, an instrument designed with a plastic case might have had two case halves fastened together with four screws. Often, the screws were of different lengths. One might be 1", another might be 1.5", etc. When the design was complete, it functioned perfectly, so it was a success.

Manufacturing, however, had to purchase, stock, and issue four different screws. Worst of all, people assembling the instrument had to be careful to get fasteners in the right place. This complexity added stress and tension to the assembly task, and, in the process of assembling thousands of units, a few fasteners would be incorrectly placed. The result, a defective product.

During this time, we thought that if the people just cared and were more careful, the quality would be better. If people just tried harder, everything would be all right.

The people assembling the product knew that if the screws were all the same length, the whole process would be easier. Manufacturing would only have to purchase and handle one type of screw. Best of all, it would be very easy to assemble the product correctly, and the

tension of getting the right fastener in the right place would be gone.

Manufacturing was trapped. It wasn't unusual for the dies used to mold the case halves to cost \$50,000. The fasteners only cost a few cents. So the justification to make the change went something like this — "I want to spend \$50,000 to save some money on 3 cent fasteners." This was a difficult sell at best. Literally, the die was cast.

Today, we know that the quality must be designed-in initially. Manufacturing personnel, with their knowledge of manufacturing processes, need to be involved in the product design from day one. The product must be designed with all four screws of the same size. Better yet, the product needs to be designed with only one fastener. Or even better yet, the plastic case needs to snap together without any fasteners.

This is not a real story, but it does demonstrate the difference (between the early 80's and today) in our thought processes concerning quality and productivity. Today, our goal is to design manufacturing processes and the product at the same time. Product development must be a company-wide process, and quality and productivity must be designed-in, from the beginning.

Our opinions about quality are evolving. In addition to designing quality in, we have recognized the importance of learning what happens to our products in the real world. In the 1970's, when a product had a problem, our emphasis was quick and dependable service. Service is still important today, but we have learned that it is also necessary to analyze problems and determine how to prevent them in the future.

In the 70s, if someone "recognized" that some preventable or important cause might be involved, failures were analyzed and preventive action was taken. However, there was not a firm

belief, followed by assertive action, that "all" errors could, and should, be prevented. Today, we believe all causes are preventable. Although it doesn't happen often, when an integrated circuit fails, Bently Nevada's job does not end with the replacement of the device. We work with the supplier of the integrated circuit to determine the root cause of the problem. If the failure was a result of design, our's or the supplier's, the product is redesigned. If the cause was the result of a manufacturing process, our's or the supplier's, the process is brought under control or redesigned.

The goal is to determine the root cause of each problem and take action to prevent a recurrence. You can help by returning any failed products to Product Repair. Sometimes, products, such as probes, are discarded rather than returned, and we miss the opportunity to gain knowledge about the product. **It is important to analyze all failures.** We have established failure analysis laboratories to examine returned hardware, and the information from these efforts is crucial to improve our products.

After analysis, the knowledge gained is communicated and action taken on a company-wide basis. The prevention of problems must be effective across product lines and at all Bently Nevada Corporation facilities. For example, when our Houston, Texas manufacturing facility discovers a problem's cause, the situation must be effectively communicated to our other facilities in Minden, Nevada and Warrington, England. All organizations and people need to learn from each other's experiences, rather than each group learning independently. Broad-based learning, now called "corporate learning" as opposed to "individual learning," is an essential part of the quality journey.

These are only two examples which demonstrate the scope of our journey. The results have been phenomenal. Even though the number of our products installed in the field has increased, the total number of problems has decreased each year. Quality is a journey; we are committed to taking the steps necessary to supply products which meet or even exceed your expectations. ■